

Performance of a stabilized marl base: A case study

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Abstract: The formation of depressions and settlement in roads shortly after being constructed is one of the major challenges facing the road authorities in the Arabian Gulf States. Such problems have been closely related to the nature of pavement materials and loading conditions as well as to the proximity of groundwater tables to the surface. A major road in eastern Saudi Arabia was reported for frequent deterioration even when the construction was properly carried out. A preliminary investigation was conducted to quantify the properties of the base course material (i.e. marl soil) and the cause of failure. The laboratory investigation indicated that the marl used in the construction, similar to other marls, has acute water sensitivity and loss of strength whenever the soil is inundated. A precautionary and immediate solution was proposed to stabilize the soil with cement. Consequently, a comprehensive laboratory program was carried out to assess the performance of cement-stabilized marl mixtures under different exposure conditions. Based on the laboratory results and the traffic data for the road under investigation, four sections were constructed, two of them being without any additive while in the other two the base course being treated with 4% cement. Continuous monitoring and evaluation of the four sections for 4 years indicated that the cement-treated road sections have exhibited superior performance over the untreated ones. Unlike the untreated sections, which have experienced various forms of deterioration within a few months after construction, the stabilized sections are still in an excellent condition.

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